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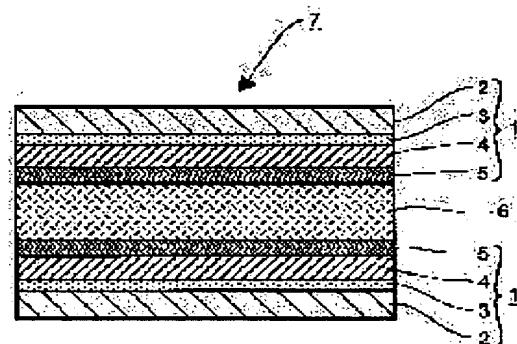
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(54) COVERING MATERIAL FOR FLAT CABLE AND FLAT CABLE USING IT

(57)Abstract:

PROBLEM TO BE SOLVED: To enhance an adhesive property with a metallic cable, and obtain high flame resistant performance, heat seal strength, insulating property, bending property, heat resistance or the like by arranging resin layers having respectively prescribed performance in order on one surface of a heat resistant base material.

SOLUTION: A covering material 1 for a flat cable is constituted by arranging a curing adhesion accelerator layer 3, a resin layer 4 containing a flame resistance applying agent and a resin layer 5 having an adhesive property and a self-adhesive property to a conductor in order on one surface of a flexible heat resistant base material 2. A surface of the resin layer 5 having an adhesive property and a self-adhesive property to the conductor to constitute the covering material 1, is superposed on both surfaces of the conductor 6, and afterwards, the covering material 1 is stuck to both surfaces of the conductor 6 by performing a heat seal by heating or the like, and a flat cable 7 is manufactured.



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CLAIMS

[Claim(s)]

[Claim 1] Covering material for flat cables characterized by coming to prepare a hardening mold adhesion promoter layer, the resin layer containing a fire-resistant grant agent, and the resin layer that has the adhesive property and self-adhesive property to a conductor in one side of a heat-resistant base material which has flexibility one by one.

[Claim 2] The amount of residual solvents in the resin layer which has the adhesive property and self-adhesive property to a conductor is 300 mg/m². Covering material for flat cables indicated to above-mentioned claim 1 characterized by being the following.

[Claim 3] The flat cable characterized by making the resin layer which has the adhesive property and self-adhesive property to the conductor for the covering material for flat cables which comes to prepare a hardening mold adhesion promoter layer, the resin layer containing a fire-resistant grant agent, and the resin layer that has the adhesive property and self-adhesive property to a conductor in one side of a heat-resistant base material which has flexibility one by one to both sides of a conductor counter, piling up, and coming to cover.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention relates to the covering material for flat cables of the electric insulation excellent in the fire retardancy applied to the flat cable used for internal wiring of an electron and electrical machinery and apparatus, such as a personal computer, a liquid crystal display, a cellular phone, a printer, and a copying machine, an automobile, others, etc. in more detail, thermal resistance, an adhesive property, etc., and the flat cable using it about the flat cable which used the covering material for flat cables, and it.

[0002]

[Description of the Prior Art] Conventionally, the so-called vinyl chloride covered wire which covered polyvinyl chloride resin is mainly used for conductors, such as copper wire, as electric wiring material. There are dramatically many especially numbers of circuit used for an automobile, and the weight is remarkable. The flat cable which put and formed two or more conductors with the insulating film of a couple with which miniaturization of covered wire is demanded, and with which it became depending and the adhesives layer was formed is developed as the number of electric wiring material increases in recent years. It ** and the covering material for flat cables which comes to form the heat sealant layer which contains saturated polyester resin and a flameproofing agent in heat-resistant base materials which come to carry out the laminating of the film of polyvinyl chloride resin to heat-resistant base materials, such as biaxial-stretching polyester film, in a dry lamination as a heat sealant layer, such as covering material for flat cables and biaxial-stretching polyester film, through a heat-curing mold adhesion promoter layer as covering material for flat cables with a coating method is used. **(ing), it fusing a heat sealant layer by a hot calender roll method etc., and fitting in a metallic cable into a heat sealant layer, after the above covering material for flat cables confronts the heat sealant layer and puts a metallic cable, it carries out heat adhesion of the heat sealant layers, and has composition which covers a metallic cable.

[0003]

[Problem(s) to be Solved by the Invention] In by the way, the case of the covering material for flat cables which comes to carry out the laminating of the film of polyvinyl chloride resin to heat-resistant base materials, such as biaxial-stretching polyester film, in a dry lamination as a heat sealant layer in the above-mentioned covering material for flat cables The film of the polyvinyl chloride resin as a heat sealant layer It is lacking in a metallic cable and a heat adhesive property, and there is a trouble that an opening occurs between the film of polyvinyl chloride resin and a metallic cable, or a heat sealant layer causes delamination with the pressure of an opening to it under a hot environment. Furthermore, in the case of the above-mentioned covering material for flat cables, it is lacking in flexibility, and since the film of polyvinyl chloride resin is used, it may also become the problem of environmental destruction. moreover, in order to give fire-resistant advanced ability in the case of the covering material for flat cables which comes to form the heat sealant layer which contains saturated polyester resin and a flameproofing agent in the above-mentioned heat-resistant base materials, such as biaxial-stretching polyester film, through a heat-curing mold adhesion promoter layer with a coating method When it ** by adding the flameproofing agent more than a fixed rate and does in this way into a heat sealant layer, a saturated polyester resin content is limited remarkably and there is a trouble that high heat-sealing reinforcement cannot be obtained. Moreover, when fitting in a metallic cable by the hot calender roll method as mentioned above, a heat sealant layer needs about 25 - 50% of coating thickness, i.e., the thickness of 30 - 100 micrometer/dry, to the thickness of a metallic cable, it **, and when coating of the saturated polyester resin constituent which contains a flameproofing agent for the purpose of the thickness is carried out, it has the trouble that it is remarkable to

remove the solvent in this heat sealant layer etc. thoroughly, and it is difficult. Furthermore, in the above, in order to remove the solvent in a heat sealant layer etc. thoroughly, there is need, such as installing the drying furnace where distance is fully long, or falling a rate of drying remarkably, consequently a production cost is raised and there is also a trouble of causing lifting of a product price. In addition, when the solvent in a heat sealant layer etc. cannot be removed thoroughly, since the solvent has solubilized in a heat sealant layer, there is a trouble of acting plastically to saturated polyester resin, and checking an adhesive property with a metallic cable, and evaporating inside a heat sealant layer under hot environments, becoming air bubbles, and generating, consequently generating exfoliation with a heat-resistant base material, interfacial peeling between heat sealant layers, etc. Then, this invention is offering the flat cable which used the covering material for flat cables and it which are excellent in an adhesive property with a metallic cable, and have many engine performance, such as fire-resistant high ability, heat-sealing reinforcement, insulation, flexibility, and thermal resistance.

[0004]

[Means for Solving the Problem] As a result of examining many things that the above troubles should be solved, this invention person on one side of a heat-resistant base material which has flexibility Prepare a hardening mold adhesion promoter layer, the resin layer containing a fire-resistant grant agent, and the resin layer that has the adhesive property and self-adhesive property to a conductor one by one, and the covering material for flat cables is manufactured and **(ed). When a flat cable is manufactured using this, it excels in an adhesive property with a metallic cable. And it finds out that the flat cable which used the covering material for flat cables and it which have many engine performance, such as fire-resistant high ability, heat-sealing reinforcement, insulation, flexibility, and thermal resistance, can be manufactured, and this invention is completed.

[0005] That is, this invention relates to the flat cable using the covering material for flat cables and it which are characterized by coming to prepare a hardening mold adhesion promoter layer, the resin layer containing a fire-resistant grant agent, and the resin layer that has the adhesive property and self-adhesive property to a conductor in one side of a heat-resistant base material which has flexibility one by one.

[0006]

[Embodiment of the Invention] Above-mentioned this invention is explained in more detail below. First, when the configuration of the covering material for flat cables concerning this invention is explained using a drawing, drawing 1 R> 1 is the sectional view showing the outline of the lamination of the covering material for flat cables concerning this invention. The covering material 1 for flat cables concerning this invention consists of a configuration of having formed the hardening mold adhesion promoter layer 3, the resin layer 4 containing a fire-resistant grant agent, and the resin layer 5 that has the adhesive property and self-adhesive property to a conductor one by one in one side of the heat-resistant base material 2 which has flexibility, as shown in drawing 1. the field of the resin layer 5 where the covering material 1 for flat cables which ** and is applied to above-mentioned this invention has the adhesive property and self-adhesive property to the conductor which constitutes this covering material 1 for flat cables as shown in the sectional view of drawing 2 -- both sides of a conductor 6 -- superposition and after an appropriate time -- this covering material 1 and 1 for flat cables -- this -- it heat seals to both sides of a conductor 6 with heating etc., sticks on them, and a flat cable 7 is manufactured.

[0007] In above-mentioned this invention, as a heat-resistant base material which has flexibility It excels in a mechanical strength, dimensional stability, etc. And thermal resistance, chemical resistance, solvent resistance, The film thru/or sheet of resin which is rich in flexibility, insulation, etc. can be used. For example, polyethylene terephthalate, polybutylene terephthalate, Polyester system resin, such as polyethylenenaphthalate and polytetramethylene terephthalate, Polyolefine system resin, such as polypropylene and ethylene propylene rubber, Polyamide system resin, such as Nylon 12 and Nylon 66, polyimide, polyamidoimide, Polyimide system resin, such as polyether imide, polytetrafluoroethylene, Fluorine content resin, such as the Pori poly trifluoro ethylene, polyvinylidene fluoride, vinyl, etc. fluoride, Polyether sulfone, a polyether ketone, polyphenylene sulfide, Various kinds of film thru/or sheets of resin, such as tic [, such as polyarylate, polyester TERUE-Tell, all aromatic polyamide, and a polycarbonate, / the so-called engineering brass] and others, can be used. It **, and any, such as a film extended to un-extending, 1 shaft orientations, or 2 shaft orientations, are sufficient as the film of these resin, and the thickness has 10 micrometers thru/or about 50 micrometers desirable [a film] preferably 6 micrometers thru/or about 100 micrometers.

[0008] Next, it prepares in order to improve the adhesion force of the heat-resistant base material which has the above-mentioned flexibility, and the resin layer containing a fire-resistant grant agent as a hardening

mold adhesion promoter layer, to control delamination, and to improve heat adhesion working speed further and to raise a heat-resistant adhesive property in above-mentioned this invention again. It ** and a polyethyleneimine system compound, an organic titanium system compound, a polyolefine system compound, a poly-butadiene system compound, an isocyanate system compound, a polyester polyurethane system compound, a polyether polyurethane system compound, etc. can be used in this invention, for example as a hardening mold adhesion promoter which constitutes a hardening mold adhesion promoter layer.

[0009] In this invention, it is desirable to use 2 liquid hardening mold adhesion promoter which consists of combination of the polyol component which is base resin, and the isocyanate component which is a curing agent from the point that it can harden at a heat-resistant adhesive property, manufacture processing suitability, and about 30-40-degree C low temperature. In the above as base resin, for example Diol components, such as ethylene glycol, a diethylene glycol, dipropylene glycol, 1.4-butanediol, 1.6-hexandiol, and neopentyl glycol, Polyester polio-RU compounded from 2 base components, such as an adipic acid, an azelaic acid, sebacic acid, isophthalic acid, and a terephthalic acid, or its denaturation object, Polyether polyol or its denaturation objects, such as a polyethylene glycol, polyoxy propylene glycol, and poly tetrapod MECHIRENE-Tell Glico-RU, Low-molecular polyols, such as ethylene glycol, a diethylene glycol, dipropylene glycol, 1.4-butanediol, 1.6-hexandiol, neopentyl glycol, and trimethylol propane, etc. can be used.

[0010] In the above as a curing agent, for example Moreover, tolylene diisocyanate, Diphenylmethane diisocyanate, hexamethylene di-isocyanate, ISOHO phosphorus diisocyanate, tris (isocyanate phenyl), Isocyanate monomers, such as methane-tris (isocyanate phenyl) thio phosphate, The urethane prepolymer which added isocyanate monomers, such as tolylene diisocyanate and hexamethylene di-isocyanate, to trimethylol propane, Isocyanate denaturation objects, such as a hexamethylene di-isocyanate buret, hexamethylene di-isocyanate, and an isophorone diisocyanate trimer, etc. can be used. In addition, in this invention, in order to raise the adhesion acceleration force, a heat-resistant adhesive property, a high-speed heat adhesive property, etc. as opposed to the above hardening mold adhesion promoters, assistants, such as a titanium coupling agent, a silane coupling agent, and an inorganic filler, can be added to arbitration.

[0011] In this invention, if the adhesion force of the heat-resistant base material which has flexibility, and the resin layer containing a fire-resistant grant agent can be raised as thickness of a hardening mold adhesion promoter layer, it can choose suitably, and can set up, for example, 0.01 thru/or about 2 micrometers are desirable. In this invention moreover, formation of a hardening mold adhesion promoter layer It is desirable to form in the heat-resistant base material which has flexibility beforehand. As the forming method The above hardening mold adhesion promoters Toluene, ethyl acetate, alcohols, A constituent can be constituted from a condition of having solubilized or distributed to solvents, such as a methyl ethyl ketone, and coating methods, such as for example, the gravure reversing method, the roll coat method, and the gravure direct method, can be used and formed on the heat-resistant base material which has flexibility for this.

[0012] Next, as a resin layer which contains a fire-resistant grant agent in above-mentioned this invention, it consists of resin constituents which use thermoplastics or thermosetting resin, and a fire-resistant grant agent as a principal component again.

[0013] In the above, polyethylene system resin, a polypropylene regin, polystyrene system resin, acrylonitrile-butadiene-styrene copolymer, an acrylonitrile styrene copolymer, polyamide system resin, polyacetal system resin, the poly acrylic or methacrylic system resin, polycarbonate system resin, thermoplastic polyester system resin, polyvinyl acetate system resin, polyvinyl chloride system resin, fluororesin, polyvinyl alcohol system resin, thermoplastic polyurethane system resin, others, etc. can be used as thermoplastics, for example. Moreover, in the above, heat-curing mold acrylic resin, polyimide system resin, phenol system resin, epoxy system resin, silicon system resin, urea system resin, melamine system resin, unsaturated polyester system resin, diallyl phthalate system resin, xylene system resin, others, etc. can be used as thermosetting resin.

[0014] In the above as a fire-resistant grant agent, for example Furthermore, chlorinated paraffin, Chlorinated polyethylene, chlorination polyphenyl, a par clo RUPENTA cyclo decane, Chlorine systems, such as an anhydrous beef fat acid, KURORU, and an acid, tetrabromo ethane, tetrabromo butane, Tetrabromobisphenol A, hexabromobenzene, deca BUROMO bis-phenyl ether, A tetrabromo phthalic anhydride, poly dibromo phenylene oxide, A halogen-containing organic compound or inorganic compounds, such as a KISABUROMO cyclo decane and an ammonium bromide, [, such as a bromine system] Red phosphorus, triaryl phosphate, alkyl allyl compound phosphate, Alkyl phosphate, dimethyl methyl phosphate, FOSUFORINE-TO, Halogenation FOSUFONE-TOESUTERU, trimethyl phosphate,

Triethyl phosphate, tributyl phosphate, trioctylphosphate, TORIBUTOKISHI ethyl phosphate, octyl diphenyl phosphate, Tricresyl phosphate, cresyl diphenyl phosphate, Triphenyl phosphate, tris (chloro ethyl) phosphate, Tris (2-chloropropyl) phosphate, tris (2,3-dichloro propyl) phosphate, Tris (2,3-dibromopropyl) phosphate, tris (BUROMO chloropropyl) phosphate, Screw (2,3-dibromopropyl) 2,3-dichloro propyl phosphate, Screw (chloropropyl) mono-octyl phosphate, poly FOSUHONE-TO, Phosphoric ester or phosphorus compounds, such as poly phosphate, aromatic series poly phosphate, and dibromo neo benz RUGURIKO-RU, Polyol compounds, such as FOSUFONE-TO mold polyol, phosphate mold polyol, and halogen-containing polyol, An aluminum hydroxide, a magnesium hydroxide, an antimony trioxide, an antimony trichloride, Antimony pentoxide, boric-acid zinc, boric-acid antimony, a boric acid, molybdic-acid antimony, A molybdic-acid ghost, molybdenum oxide, the Lynn-nitride, calcium-aluminum-silicate, A zirconium compound, a tin compound, a dawsonite, a calcium-aluminate hydrate, Nitrogen content compounds, such as metal powders, such as oxidization copper, copper powder, a calcium carbonate, and metaboric acid barium, or an inorganic compound, other silicone system polymers, a ferrocene, boletic acid, a maleic acid, triazine, isocyanurate, a urea, and a guanidine compound, etc. can be used.

[0015] **, add a kind of the above fire-resistant grant agents, or more than it more than a kind of above thermoplastics or thermosetting resin, or it in this invention, and if still more nearly required Other additives are added. For example, toluene, ethyl acetate, alcohols, Knead in solvents, such as a methyl ethyl ketone, a diluent, etc., solubilize or decentralize, and coating liquid is manufactured. It can coat with coating methods, such as for example, NAIKUO-TO, a roll coat, GURABIKO-TO, KISUKO-TO, a bar coat, RODDOKO-TO, and KOMMAKO-TO, with this, and the resin layer containing the fire-resistant grant agent of thickness 20 thru/or 60 micrometer/dry grades can be formed. In addition, in the above, as a vehicle which constitutes coating liquid, when using thermosetting resin, it is desirable after coating to give the curing treatment for seven days at 100 thru/or 200 degrees C. Moreover, in the above, it is desirable for the former to blend and use the latter at a rate of about 40 thru/or 80 weight part to about 20 thru/or 60 weight sections in consideration of points, such as blocking resistance, layer indirect arrival nature, and the amount of residual solvents, as the blending ratio of coal beyond a kind of thermoplastics or thermosetting resin, a kind of more than it and a fire-resistant grant agent, or it.

[0016] Next, in this invention, the coating film by the constituent which uses as a principal component the thermoplastics which has heat-sealing nature, and the bulking agent for blocking prevention as a resin layer which has the adhesive property and self-adhesive property to a conductor can constitute. In the above, as thermoplastics which has heat-sealing nature That what is necessary is just what fuses according to an operation of heat and has thermal melting arrival nature mutually For example, polyethylene system resin, a polypropylene regin, ionomer resin, An ethylene-vinylacetate copolymer, an ethylene-acrylic acid, or a methacrylic-acid copolymer, Ethylene-acrylic ester or a methacrylic ester copolymer, ethylene propylene rubber, polyvinyl acetate system resin, and acrylic -- moreover -- ** -- methacrylic system resin -- Polystyrene system resin, polyvinyl chloride system resin, poly acrylic nitril system resin, polybutene system resin, poly pentene system resin, saturated polyester system resin, polyamide system resin, polyvinyl-acetal system resin, thermoplastic polyurethane system resin, others, etc. can be used. Moreover, in the above, extenders, such as a calcium carbonate, a barium sulfate, a magnesium carbonate, an aluminum oxide, and titanium oxide, or white pigments, the powder of other inorganic compounds, a glass frit, fluororesin powder, polyolefin resin powder, others, etc. can be used as a bulking agent, for example.

[0017] **, mix a kind of thermoplastics which has the above heat-sealing nature thru/or more than it, and a kind of a bulking agent thru/or more than it in this invention, and if still more nearly required Add other additives to arbitration, for example, solvents, such as toluene, a xylene, a methyl ethyl ketone, methyl isobutyl ketone, anone, ethyl acetate, and butyl acetate, a diluent, etc. are used. Fully knead and viscosity 10 [about] thru/or about 2000cps coating liquid are manufactured. This For example, NAIKUO-TO, a roll coat, GURABIKO-TO, KISUKO-TO, It coats with coating methods, such as a bar coat, RODDOKO-TO, and KOMMAKO-TO, and the coating membrane layer of thickness 10 thru/or 40 micrometer/dry grades is formed. Further by hot air drying etc. Amount of residual solvents 300 mg/m² The resin layer which has the following adhesive properties and self-adhesive properties to a conductor can be formed. Moreover, in the above, it is desirable to use it at a rate of about 0.1 thru/or 5 weight part to the thermoplastics 100 weight section as the blending ratio of coal beyond a kind of thermoplastics which has heat-sealing nature, or it, and beyond a kind of a bulking agent or it, blending a bulking agent.

[0018]

[Example] Next, an example is given about above-mentioned this invention, and this invention is explained in more detail.

The fire-resistant grant agent (ethyl company make, trade name, SAYTEX8010+ antimony-trioxide + aluminum hydroxide) 150 weight section, the toluene 100 weight section, and the methyl-ethyl-ketone 100 weight section were added to the epoxy acrylic resin (Toyobo Co., Ltd. make, trade name, KW-450) 100 weight section of the coating agent heat-curing mold for resin layers containing an example 1(1). fire retardancy grant agent, these were fully kneaded, and the coating agent for resin layers containing a fire-resistant grant agent was manufactured.

(2) . -- the coating agent for resin layers which has the adhesive property and self-adhesive property to a conductor -- a line -- saturated polyester resin (the Toyobo Co., Ltd. make --) trade name [] -- the inside of the resin liquid which consists of the Byron #500/Byron #200=1/1 100 weight section, the toluene 100 weight section, and the methyl-ethyl-ketone 100 weight section -- the true spherical silica (the particle size of 1.0micro) of high grade type SO-C3 The coating agent with a viscosity of 1000cps was manufactured by adding specific surface area of 5m² / g³ weight section, and diluting with the equivalent partially aromatic solvent of toluene and a methyl ethyl ketone further, after a sand mill is sufficient and making it distribute.

(3) -- one side of the heat-resistant base material which consists of a polyethylene terephthalate film (the Teijin, Ltd. make, low heat shrink type) with a manufacture thickness [of the covering material for . flat cables] of 25 micrometers -- an adhesion promoter (base resin / curing agent = polyester polio-RU / diphenylmethane diisocyanate = 4/1) -- the gravure liver skorts method -- 0.5 micro/dry -- coating -- it dried, and in the 50 more-degree C ambient atmosphere, aging for five days was performed and the hardening mold adhesion promoter layer was formed. Next, the resin layer which contains the coating agent for resin layers containing the fire-resistant grant agent manufactured above with a comma coating method, and contains a fire-resistant grant agent with a thickness of 28 micrometers coating and by drying and performing heat curing for 180 more degrees C and seven days was formed in the front face of the hardening mold adhesion promoter layer formed above. Next, coating of the coating agent for resin layers which has the adhesive property and self-adhesive property to the conductor manufactured above on the front face of the resin layer containing the fire-resistant grant agent formed above is carried out with 3 liver skorts method. After fully drying, by performing aging for seven days in a 50 more-degree C ambient atmosphere The resin layer which has the adhesive property and self-adhesive property to a conductor with a thickness of 12 micrometers is formed, and the amount of residual solvents is 20 mg/m². The covering material for flat cables concerning this invention with a coat thickness [following / total] of 40 micrometers was manufactured. Next, the covering material for flat cables manufactured above is used, and they are line speed about 5.0 m/min to both sides of a conductor with a thickness of 35 micrometers. It stuck at grade and the flat cable was able to be manufactured.

[0019] example 2 (1) . -- the resin layer coating agent which has the adhesive property and self-adhesive property to a conductor -- a line -- saturated polyester resin (the Toyobo Co., Ltd. make --) It is the true spherical silica (the particle size of 1.0micro) of high grade type SO-C3 in the resin liquid which consists of a trade name, the Byron #300/Byron #200=2/1 100 weight section and the methyl-ethyl-ketone 100 weight section, the toluene 50 weight section, and the methyl-isobutyl-ketone 50 weight section. After adding specific surface area of 5m² / g³ weight section and making it fully distribute by the sand mill, the coating agent with a viscosity of 2000cps was manufactured by diluting with the solvent which consists of a rate of mixed ratio 20/10/10 of a methyl ethyl ketone, toluene, and methyl isobutyl ketone further.

(2) -- one side of the heat-resistant base material which consists of a polyethylene terephthalate film (the Teijin, Ltd. make, low heat shrink type film) with a manufacture thickness [of the covering material for . flat cables] of 38 micrometers -- an adhesion promoter (a principal member/curing agent = polyester polio-RU / diphenyl meta-diisocyanate = 4/1) -- the gravure liver skorts method -- 0.5 micro/dry -- coating -- it dried, and further, in the 50-degree C ambient atmosphere, aging for five days was performed and the hardening mold adhesion acceleration layer was formed. Next, coating and the resin layer which contains the coating agent for resin layers containing the fire-resistant grant agent indicated in the example 1 with a KOMMAKO-TO method, dries and contains a fire-resistant grant agent with a thickness of 42 micrometers by performing heat curing for 180 degrees C and seven days further were formed in the front face of the hardening mold adhesion acceleration layer formed above. Subsequently, coating of the coating agent for resin layers which has the adhesive property and self-adhesive property to the conductor manufactured by above (1) on the front face of the resin layer containing the fire-resistant grant agent formed above is carried out with 3 liver skorts method. After fully drying, the resin layer which has the adhesive property and self-adhesive property to a conductor with a thickness of 140 micrometers by performing aging for seven days is further formed into a 50-degree C ambient atmosphere. Residual solvent 50 mg/m² The covering material for flat cables concerning this invention of the 60 micrometers of the following coat thickness [total] was

manufactured. Next, the covering material for flat cables manufactured above was used, it stuck on both sides of a conductor with a thickness of 140 micrometers by line speed about about 5.0 m/min, and the flat cable was able to be manufactured.

[0020]

[Effect of the Invention] By the above explanation, this invention on one side of a heat-resistant base material which has flexibility so that clearly Prepare a hardening mold adhesion promoter layer, the resin layer containing a fire-resistant grant agent, and the resin layer that has the adhesive property and self-adhesive property to a conductor one by one, and the covering material for flat cables is manufactured and **(ed). When a flat cable is manufactured using this, it excels in an adhesive property with a metallic cable. And the flat cable which used the covering material for flat cables and it which have many engine performance, such as fire-resistant high ability, heat-sealing reinforcement, insulation, flexibility, and thermal resistance, can be manufactured. Since the covering material for flat cables concerning this invention is performing engine-performance separation of a fire-resistant layer and a heat sealant layer unlike what gave the fire-resistant grant agent like before to the heat sealant layer, the large improvement in sheet seal reinforcement is accepted. Furthermore, in this invention, by hardening in a fire-resistant layer using heat-curing mold resin, thin film-ization of the heat sealant layer which used thermoplastics is attained, the solvent clearance at the time of formation of a heat sealant layer becomes very easy, and heat-resistant degradation of the heat sealant layer by the residual solvent can be controlled.

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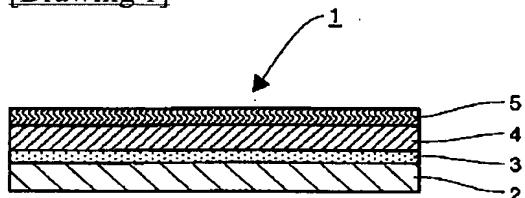
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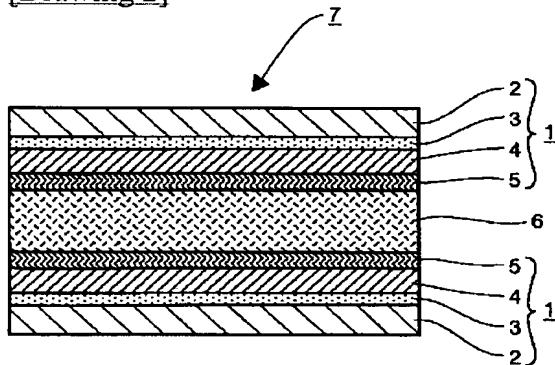
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DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]